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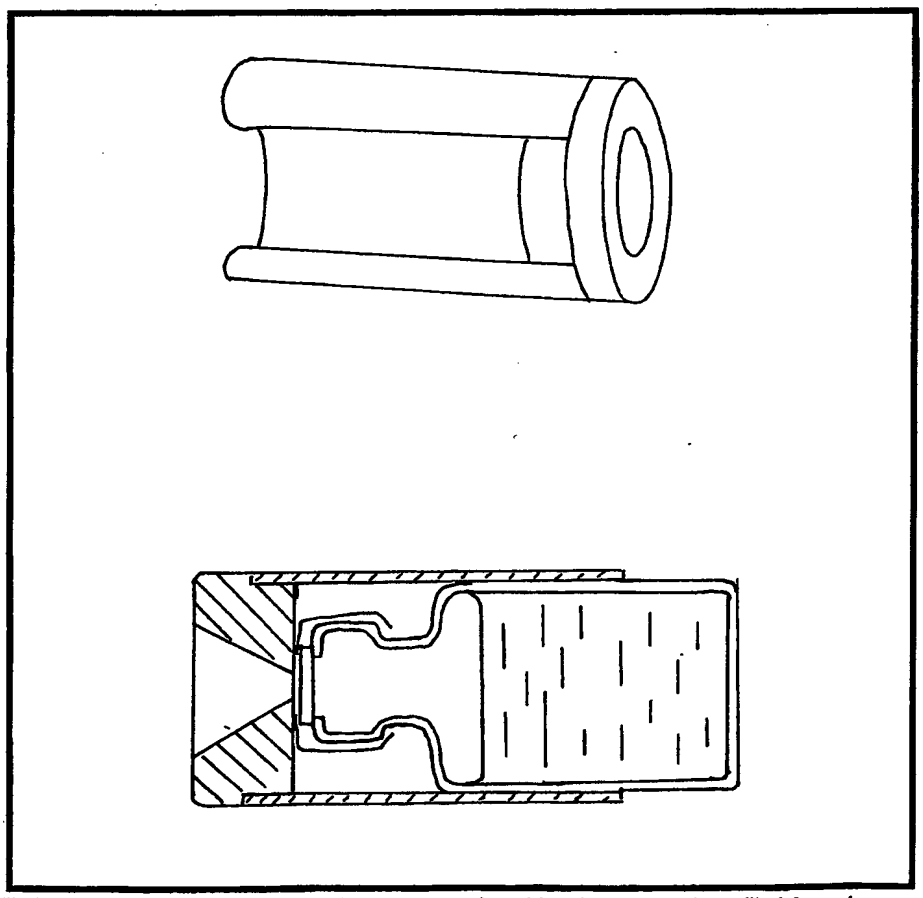
(54) A device for use as an aid to loading a hypodermic syringe

(57) A device for assisting blind or partially blind diabetics to load a hypodermic syringe with insulin comprises an annular guide member 24. The member 24 has a frusto-conical internal surface 26, which converges smoothly from a relatively large inlet 28 for receiving the needle of the syringe to a relatively smaller outlet 30. A part-cylindrical resilient skirt member 36 projects coaxially downwardly from the periphery of the member 24, and is adapted to fit over and coaxially surround a typical cylindrical insulin bottle, thereby locating the member 24 such that the outlet 30 is close to and aligned with the entry into the bottle. The guide member 24 thus guides the needle into the entry of the bottle.



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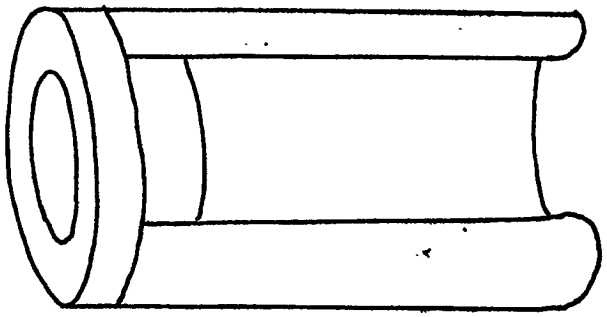
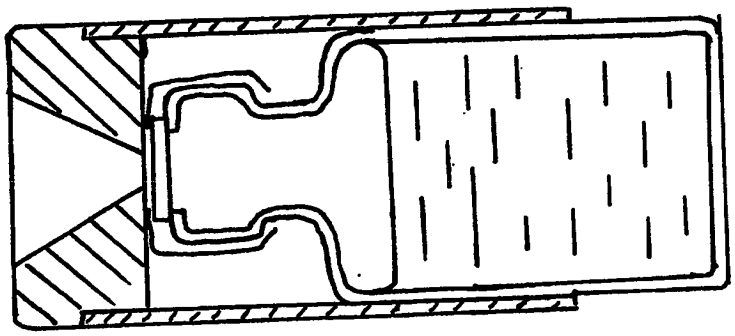
The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.





SPECIFICATION

A device for use as an aid to loading a hypodermic syringe

This invention relates to a device for use as an aid to loading a hypodermic syringe.

The treatment of patients suffering from diabetes often requires that they should receive regular injections of insulin: since the injections are required fairly frequently, they are normally self-administered. Insulin sufficient for, say, ten doses is typically supplied to the patient in a small bottle having a cap containing a self-sealing membrane of rubber or a rubber-like material, through which the needle of a hypodermic syringe can be inserted into the bottle to load the syringe.

Unfortunately, it is not uncommon for some diabetics also to suffer from partial or total blindness. This makes loading the syringe rather difficult, since the aforementioned membrane is typically less than $\frac{1}{2}$ cm in diameter. It is an object of the present invention to provide a device for alleviating this difficulty.

According to the present invention, therefore, there is provided a device for use as an aid to loading a hypodermic syringe from a bottle having a relatively small entry for receiving the needle of the syringe, the device comprising a guide portion having an inlet for receiving said needle, said inlet being of significantly larger area than said entry, and a locating portion adapted to engage the bottle and locate the guide portion with respect thereto such that the needle is guided into said entry by the guide portion.

Advantageously, said guide portion is annular and has a substantially frusto-conical internal surface, said surface converging smoothly from said inlet to an outlet which, when the guide portion is located with respect to the bottle by the locating portion, is disposed in substantial alignment with, and in proximity to, said entry.

In a preferred embodiment of the invention, for use with a substantially cylindrical bottle having a coaxially disposed entry at one end thereof, the locating portion comprises a part-cylindrical skirt member adapted to engage more than half the circumference of the bottle over a significant part of the axial length of the bottle. In this case, the skirt member is preferably resilient and has a diameter slightly smaller than that of the bottle, whereby it tends to grip the bottle.

Alternatively, still for use with such a cylindrical bottle, the locating portion may be wholly cylindrical and a sliding fit over a significant part of the axial length of the bottle.

The device may be made from stainless steel, preferably with at least the frusto-conical surface being polished. The guide portion and the locating portion may conveniently be separately formed and then secured together by brazing or welding.

Alternatively, the device may be moulded in one piece in a plastics material, typically an A.B.S. thermosetting plastics material, advantageously with at least the frusto-conical surface being metal-coated, preferably with chromium.

The invention will now be described, by way of non-limitative example only, with reference to the accompanying drawings, of which:

Figure 1 is a sectional view of a device in accordance with the present invention for use as an aid to loading a hypodermic syringe; and

Figure 2 is a perspective view of the device of Fig. 1.

The device of Figs. 1 and 2 is indicated generally at 10, and is shown in Fig. 1 fitted to a bottle 12 of the kind in which insulin is normally supplied to patients suffering from diabetes. The insulin is indicated at 14, and is typically supplied in a quantity sufficient for, say, ten or twenty doses.

As is usual, the bottle 12 has a substantially cylindrical main body portion 15, and a reduced-diameter neck portion 16 onto which is crimped an aluminium closure member or cap 18. The cap 18 has an entry orifice 20, which is typically less than $\frac{1}{2}$ cm in diameter and which is closed by a self-sealing membrane 22 of rubber or a rubber-like material trapped between the cap 18 and the top of the neck portion 16 of the bottle 12.

In order to load a hypodermic syringe with a dose of the insulin 14 contained in the bottle 12, the patient holds the bottle in one hand and inserts the needle of the syringe through the entry orifice 20 (and through the membrane 22 closing this orifice) with the other hand. Since the entry orifice 20 is typically less than 1 cm in diameter, this can, in the absence of the device 10, cause difficulties, particularly if the patient is partially or totally blind.

However, the device 10 substantially overcomes these difficulties.

Thus the device 10 comprises an annular guide member 24 machined from stainless steel, the interior of the guide member 24 defining a coaxially disposed duct 25. The guide member 24 has a frusto-conical radially inner surface 26, which thus defines the walls of the duct 25, the surface 26 converging smoothly from an inlet end 28 of the duct 25 to an outlet end 30 thereof. The diameter of the inlet end 28 of the duct 25 is typically at least twice the diameter of the entry orifice 20 in the cap 18 of the bottle 12, while the diameter of the outlet end 30 is just less than the diameter of the entry orifice 20.

The guide member 24 has a substantially cylindrical external surface 32, with a re-

duced-diameter portion 34 machined therein at the end corresponding to the outlet end 30 of the duct 25; a locating member in the form of a part-cylindrical skirt 36, typically made from stainless steel sheet, is coaxially secured, e.g. by brazing, to this reduced diameter portion 34. The skirt 36 thus extends coaxially of the guide member 24 and the duct 25, away from the outlet end 30 of the duct 25.

The skirt 36 typically extends around about three quarters of the circumference of a cylinder, leaving a gap 38 which extends parallel to the axis of the cylinder: the combination of this gap with the stainless steel sheet construction renders the skirt 36 somewhat resilient. The internal diameter of the skirt 36, i.e. the diameter of the portion 34 of the guide member 24, is chosen, for reasons which will become apparent hereinafter, to be very slightly less than the external diameter of the main body portion 15 of the bottle 12. Additionally, the axial length of the skirt 36 is typically chosen to be just over half the height of the bottle 12.

In use, the device 10 is fitted over the top of the bottle 12, and pushed downwardly until the underside of the guide member 24 comes into contact with the top of the cap 18, as shown in Fig. 1. By virtue of its resilience and dimensions, the skirt 36 grips the bottle 12, and at the same time locates the guide member 24 with respect to the bottle 12 such that the outlet end 30 of the duct 25 is precisely aligned with, and in very close proximity to, the entry ofice 20 in the cap 18 of the bottle.

In order to load the aforementioned hypodermic syringe, the patient now merely has to insert the needle of the syringe into the inlet end 28 of the duct 25 in the device 10, which inlet end is at least four times greater in area that the entry orifice 20. The smoothly converging surface 26 defining the walls of the duct 25 then guides the point of the needle into the entry orifice 20. The chances of the patient pricking the fingers of the hand holding the bottle 12 are thus obviously much reduced by the use of the device 10.

The device 10 preferably has a highly polished finish, in order to facilitate cleaning after use. Additionally the fact that the surface 26 being of stainless steel, is relatively hard serves serves to reduce the possibility of scratching or scoring by the needle of the hypodermic syringe, which also facilitates keeping the device 10 clean. The presence of the gap 38 in the skirt 36 further facilitates cleaning, particularly of the underside of the guide member 24. If desired, the device 10 may be kept in a suitable sterilising solution when not in use, to ensure its continual cleanliness.

Bottles such as the bottle 12 are typically made in one of a limited number of standard sizes. Accordingly, it is a relatively simple matter either to provide a respective device 10 for each standard size of bottle, or to provide the device 10 with a plurality of detachable skirts 36 sized to correspond to the standard bottle sizes.

A number of other modifications can be made to the described embodiment of the invention. For example, instead of being made in two pieces from stainless steel, it can be moulded in one piece from a suitable A.B.S. thermosetting plastics material, and then metal coated, e.g. with chromium, over at least the surface 26, in order to render this surface scratch-resistant. Further, the skirt 36 can be wholly cylindrical, rather than part-cylindrical, and a sliding fit over its respective bottle. Moreover, the skirt 36 can be replaced by a locating member adapted to engage the cap 18 and/or the neck portion 16 of the bottle 12: references in this specification to engaging the bottle are accordingly to be understood as including these possibilities.

Although the invention has been described in terms of its use by blind or partially blind diabetics as an aid to loading a hypodermic syringe with insulin, it can obviously be used in other contexts, e.g. as an aid to elderly or very young patients have a variety of conditions requiring self-administered injections.

CLAIMS

1. A device for use as an aid to loading a hypodermic syringe from a bottle having a relatively small entry for receiving the needle of the syringe, the device comprising a guide portion having an inlet for receiving said needle, said inlet being of significantly larger area than said entry, and a locating portion adapted to engage the bottle and locate the guide portion with respect thereto such that the needle is guided into said entry by the guide portion.

2. A device as claimed in claim 1, wherein said guide portion is annular and has a substantially frusto-conical internal surface, said surface converging smoothly from said inlet to an outlet which, when the guide portion is located with respect to the bottle by the locating portion, is disposed in substantial alignment with, and in proximity to, said entry.

3. A device as claimed in claim 1 or claim 2, for use with a substantially cylindrical bottle having a coaxially disposed entry at one end thereof, wherein the locating portion comprises a part-cylindrical skirt member adapted to engage more than half the circumference of the bottle over a significant part of the axial length of the bottle.

4. A device as claimed in claim 3, wherein the skirt member is resilient and has a diameter slightly smaller than that of the bottle, whereby it tends to grip the bottle.

5. A device as claimed in claim 1 or claim 2, for use with a substantially cylindrical bot-

tle having a coaxially disposed entry at one end thereof, wherein the locating portion comprises a cylindrical skirt member dimensioned to be a sliding fit over a significant part of the axial length of the bottle.

6. A device as claimed in any preceding claim, the device being made from stainless steel.

7. A device as claimed in claim 2 and claim 6, wherein at least the frusto-conical surface is polished.

8. A device as claimed in claim 6 or claim 7, wherein the guide portion and the locating portion are separately formed and then secured together.

9. A device as claimed in claim 8, wherein said portions are secured together by brazing or welding.

10. A device as claimed in any one of claims 1 to 5, the device being made from a plastics material.

11. A device as claimed in claim 10, the device being moulded in one piece in said plastics material.

12. A device as claimed in claim 10 or claim 11, wherein said plastics material is an A.B.S. thermosetting plastics material.

13. A device as claimed in claim 2 and any one of claims 10 to 12, wherein at least the frusto-conical surface is metal-coated.

14. A device as claimed in claim 13, wherein the frusto-conical surface is coated with chromium.

15. A device for use as an aid to loading a hypodermic syringe, the device being substantially as herein described with reference to the accompanying drawings.

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